

IEAGHG INDUSTRY CCS WORKSHOP

Challenges and Opportunities of CO₂ Capture and Storage in the Iron and Steel Industry: Understanding the Overall Perspective

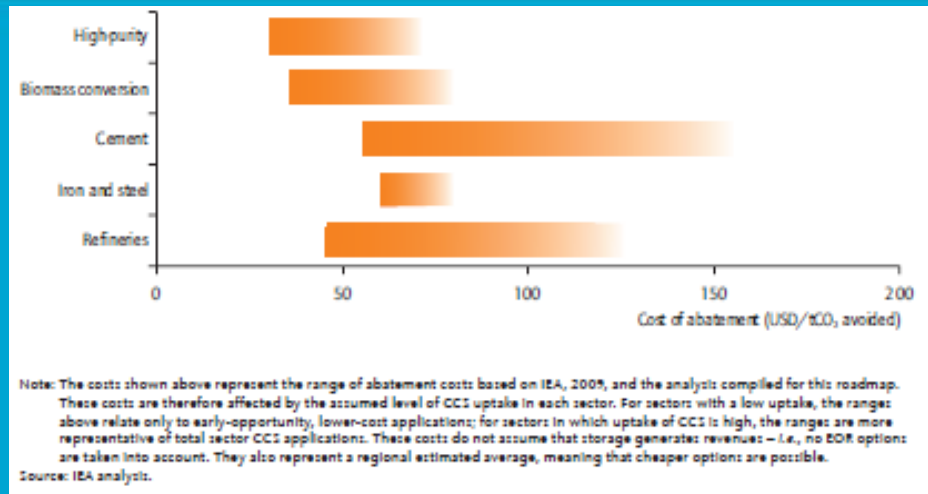
Christopher Beauman

European Bank for Reconstruction and Development

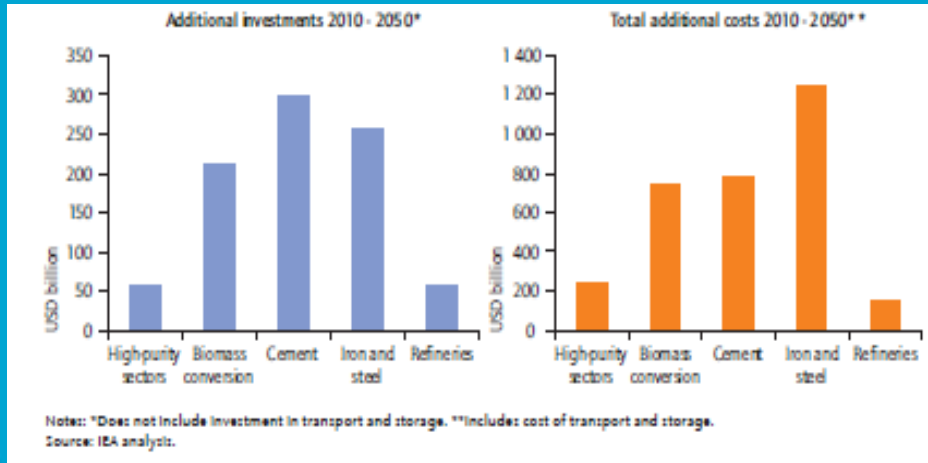
9th November 2011



CARBON CAPTURE AND STORAGE IN INDUSTRIAL APPLICATIONS



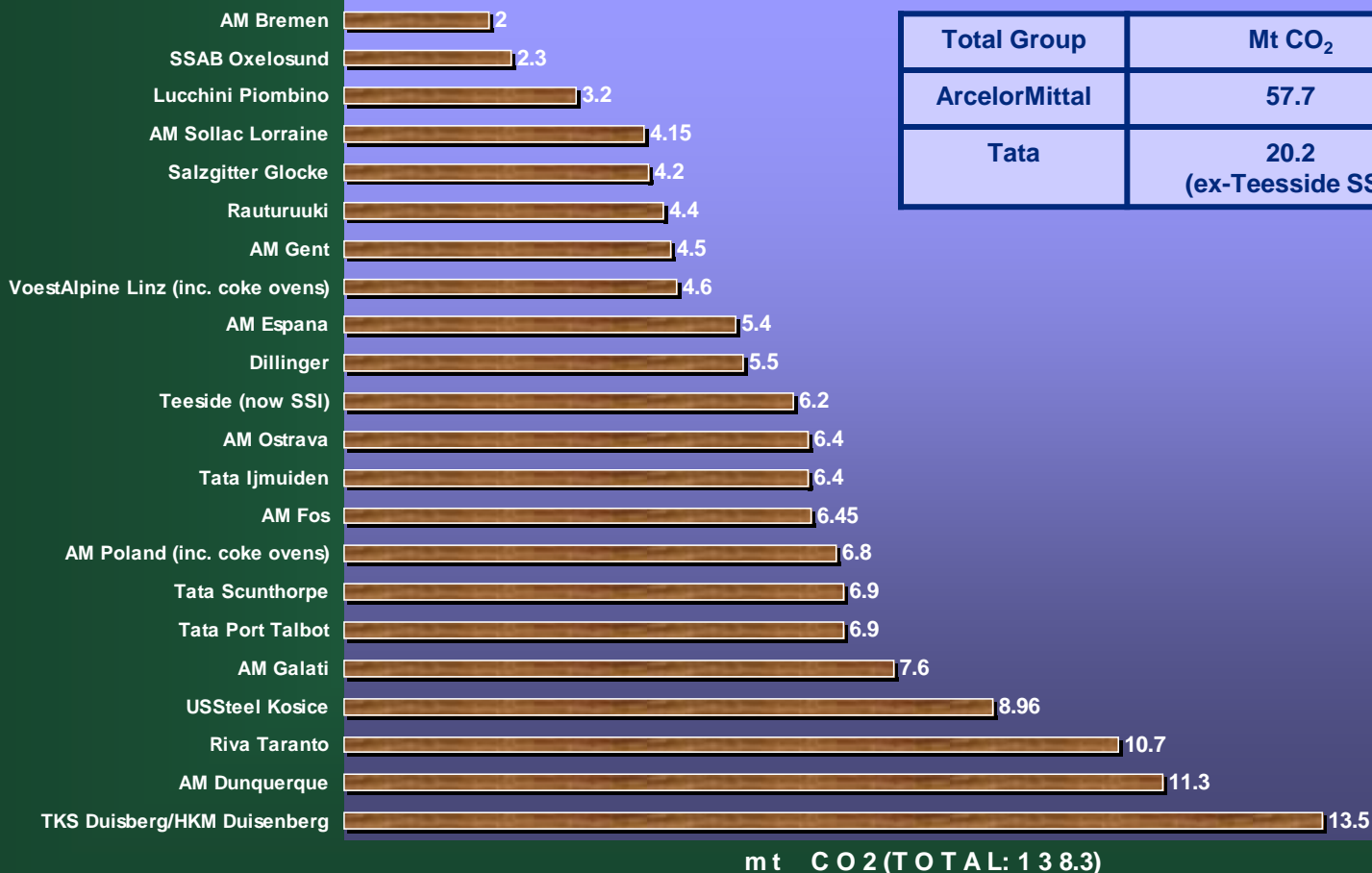
Abatement costs range most widely between and within sectors



The additional investment needs for CCS over the 2010 to 2050 period are about USD 882 billion; total additional costs are over USD 3 trillion.



22 SITES OVER 2.0mt CO₂ 2008



EU Locations

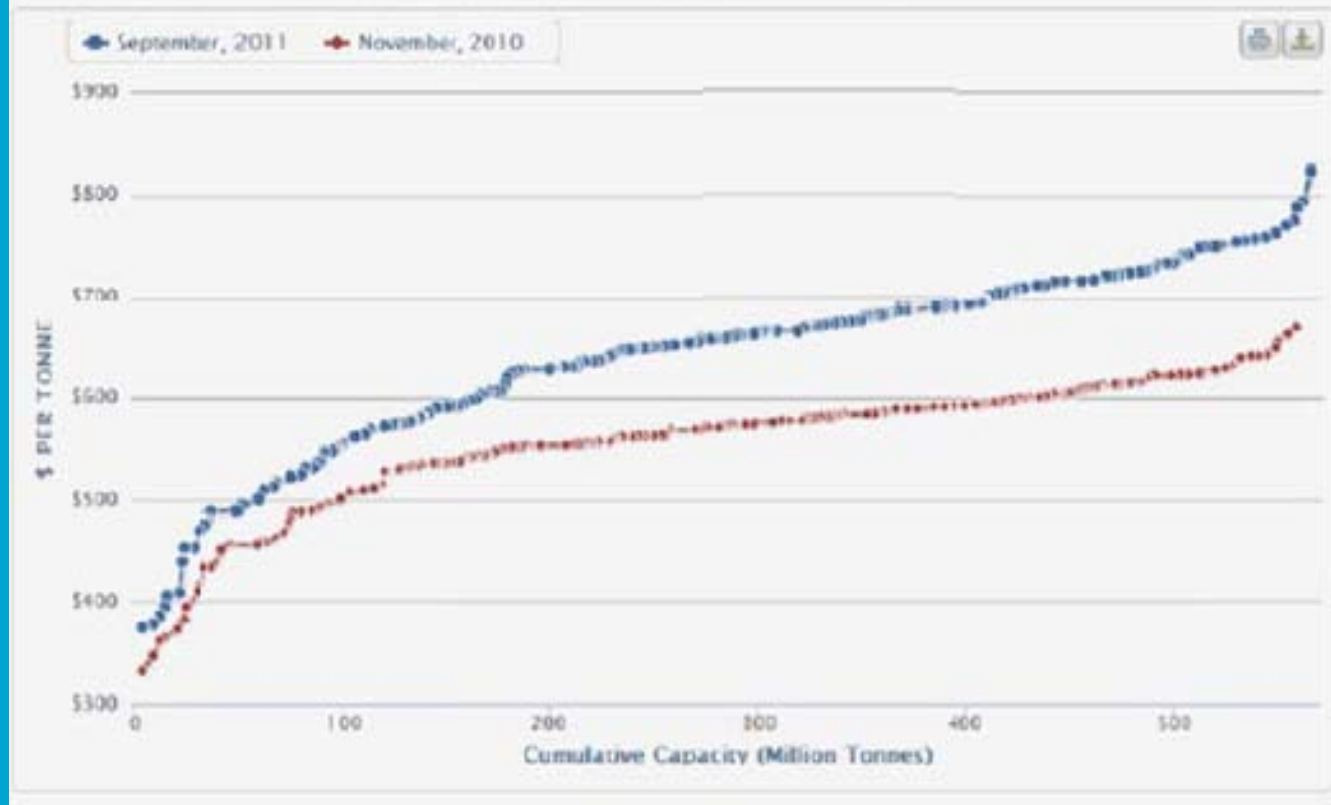
1	BREMEN
2	OXELOSUND
3	PIOBINO LIVORNO
4	SOLLAC LOPDRAINE
5	SALZGITTER GLOCKE
6	RAUTURUUKI
7	AM GENT
8	VOESTALPINE LINZ
9	AMESPANA
10	DILLINGER
11	TEESIDE
12	AM OSTRAVA
13	TATA IJMUIDEN
14	AM FOS
15	AM POLAND
16	TATA SCUNTHORPE
17	TATA PORT TALBOT
18	AM GALATI
19	US STEEL KOSICE
20	RIVA TARANTO
21	AM DUNQUERQUE
22	FKS DUISBERG/HKM DUISBERG



GLOBAL COST CURVE WORLD STEEL DYNAMICS - 2011

Hot Rolled Band Operating Costs

For 'Process All' or lightly grouped data sets (multiple months), you can zoom in by clicking on the chart and highlighting an area for a closer look. Top right corner of the chart features options that will allow you to export the chart to various file formats.



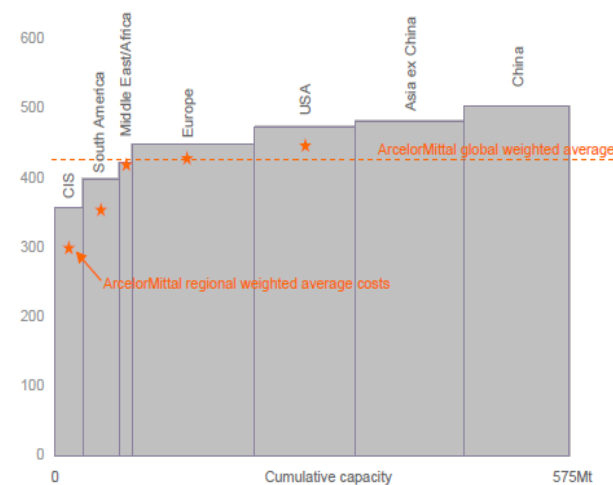
ARCELOR MITTAL COMPETITIVE POSITION - 2010

Competitive position



- Competitive does not just mean low-cost
- More important is being competitive in target markets
 - Competitive on costs
 - Competitive on quality
 - Competitive on service
- We occupy a better-than-average cost position in the regions we are serving
- We have one of the largest R&D budgets in the steel industry; this supports our product quality and innovation
- We have a strong relationship with customers which reflects in our service quality

Regional average HRC cash cost 2009 (\$/tonne)



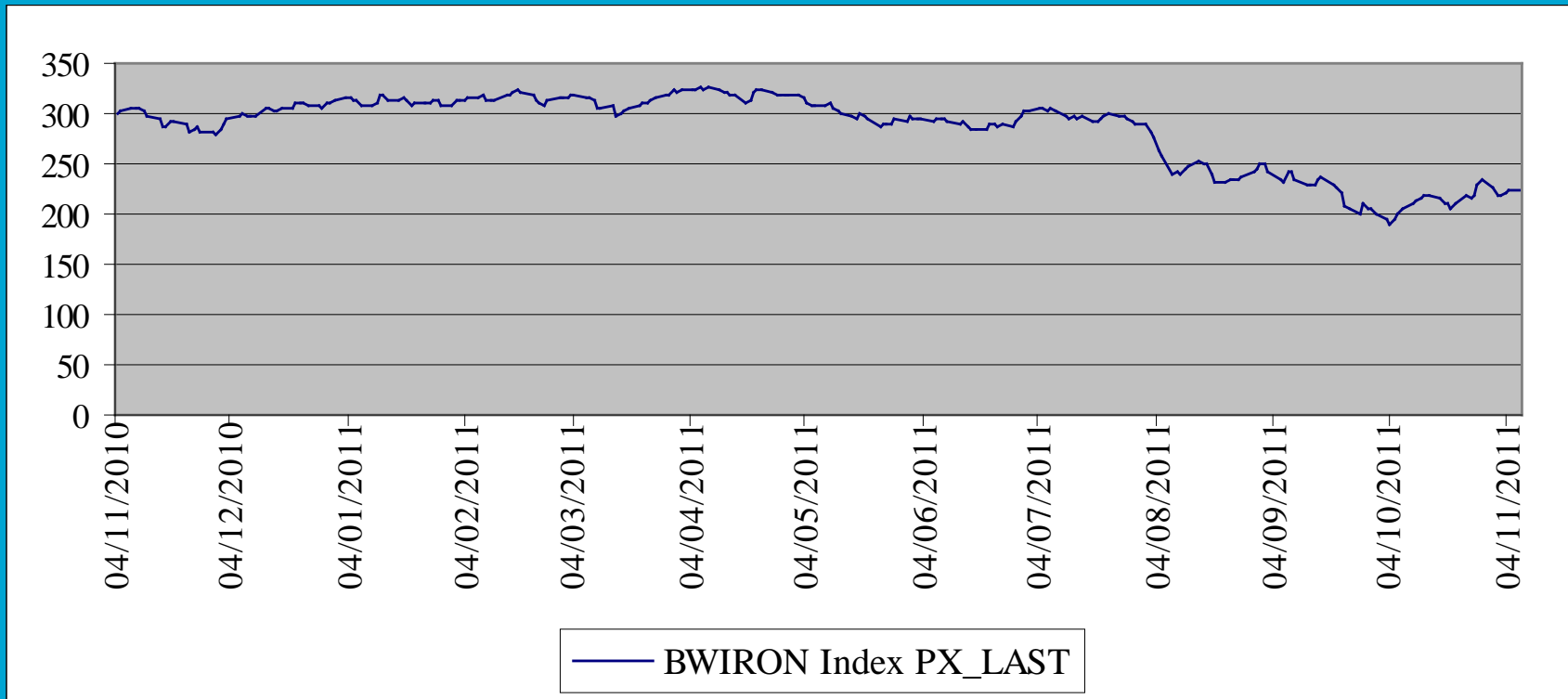
We have a strong competitive position today, but we can always improve



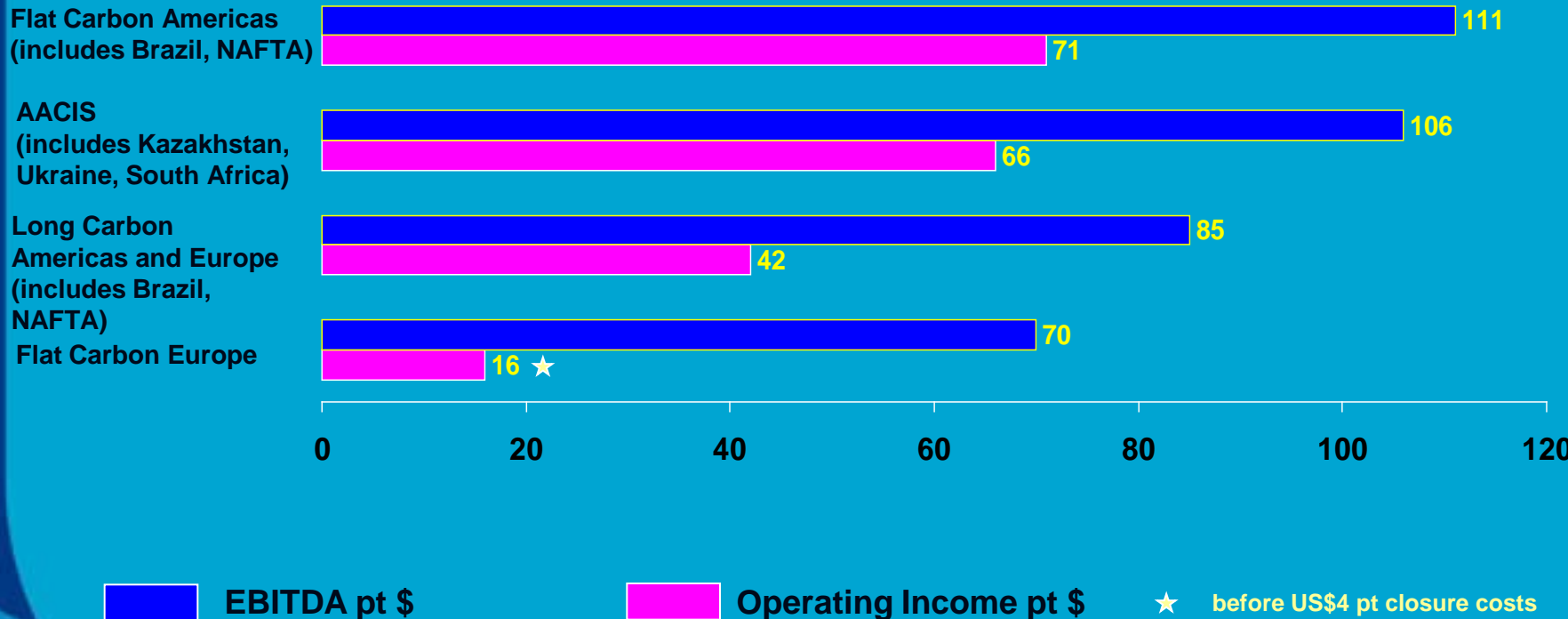
THE STEEL SECTOR

Share Price Performance

(year to 4th November 2011)



THE EUROPEAN MARGIN SQUEEZE ARCELORMITTAL 2011 (9 months)



EBITDA pt \$



Operating Income pt \$



★ before US\$4 pt closure costs



ADDRESSING THE MARGIN CHALLENGE IN EU

Asset Optimisation (ArcelorMittal)

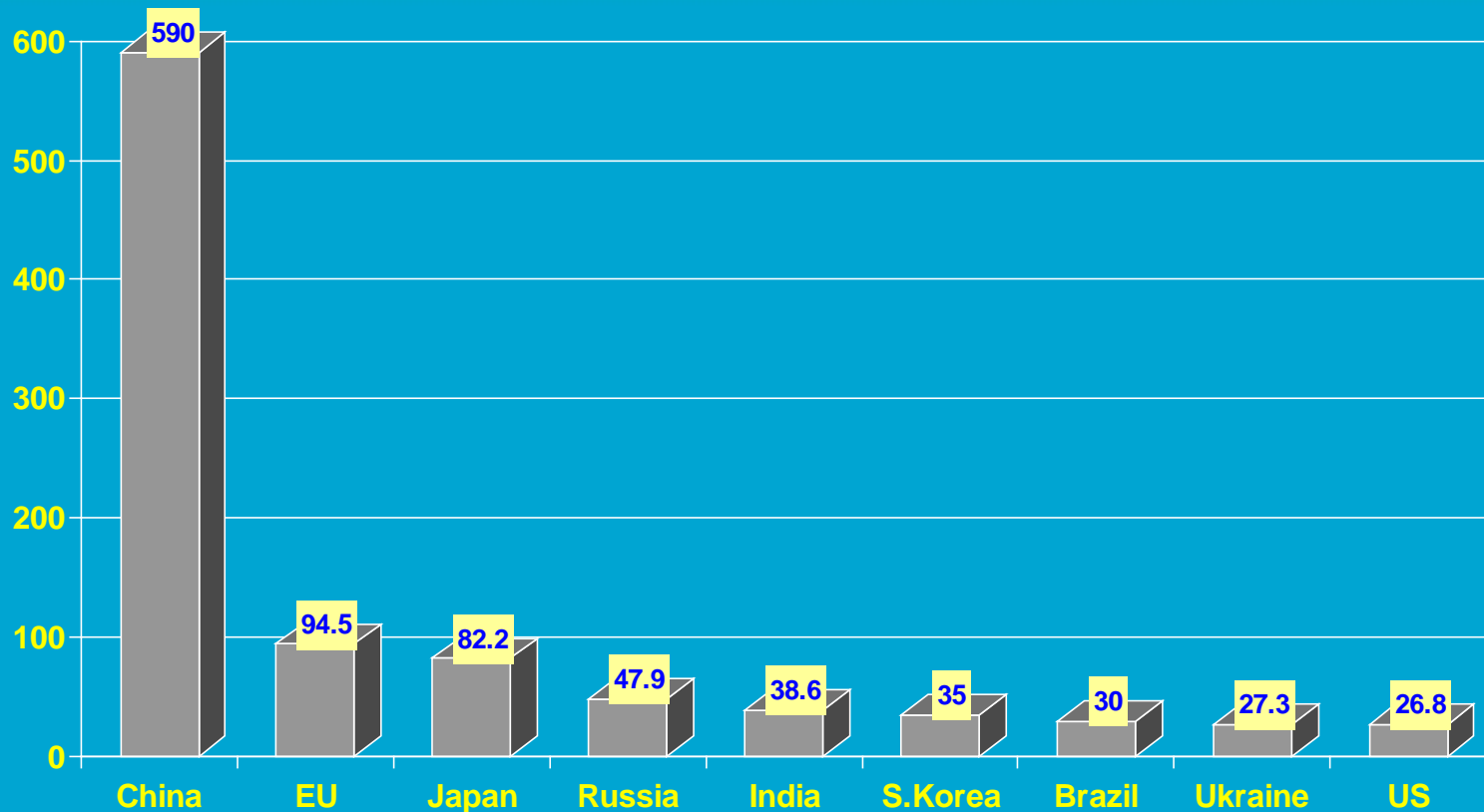
- Full utilisation of lowest cost plants
- Focus on automotive (30% of AM LCE)

Long-Term Relocation (Voestalpine)

- “Commodity grade(s)...likely to move to regions such as Russia, Ukraine, Turkey”
- “Europe has to refocus on top, top quality”



PIG IRON PRODUCTION (2010) (mt)

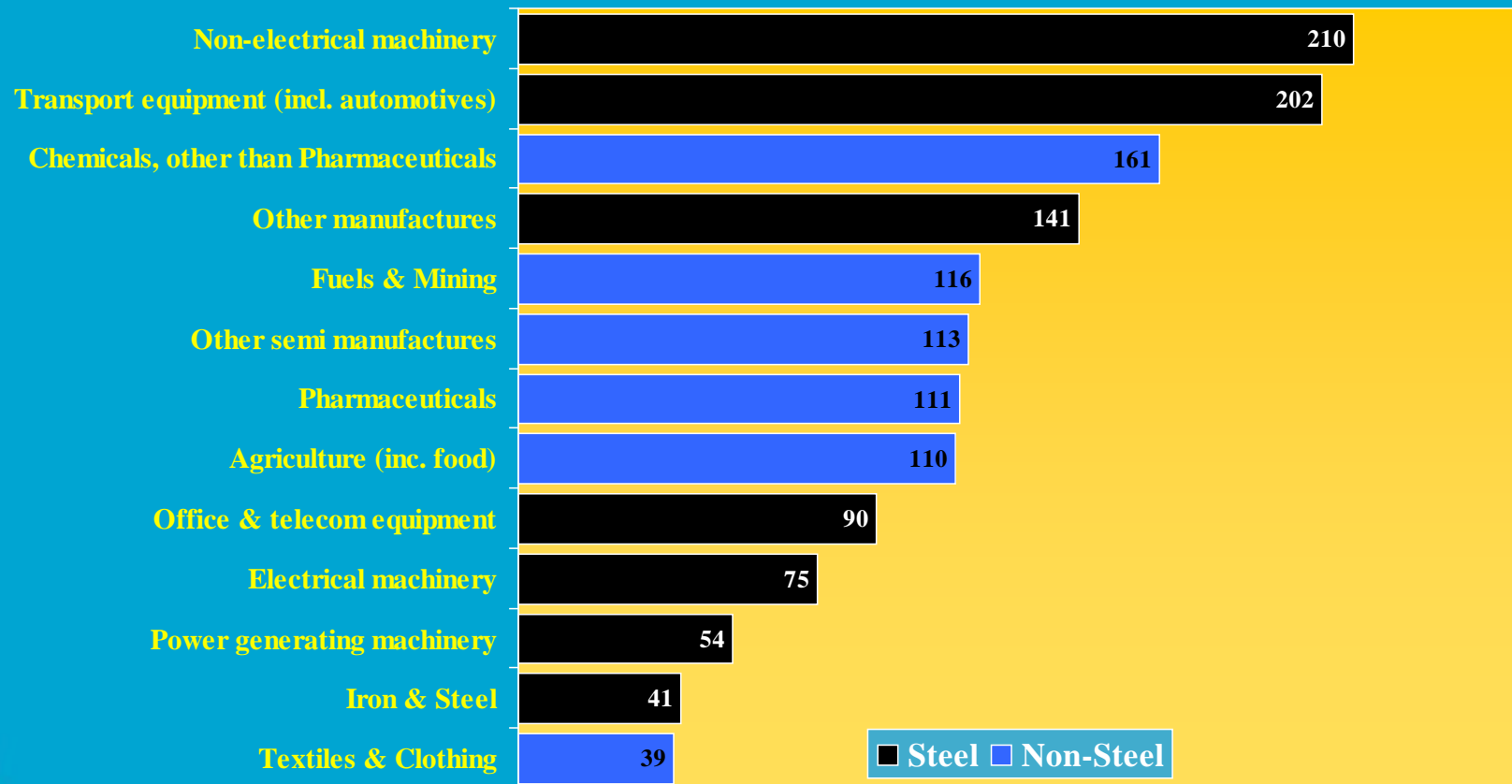


TOTAL WORLD PIG IRON PRODUCTION 1,025mt



EU EXPORT OF GOODS - 2009

US\$ billion



TACKLING CARBON LEAKAGE (UK Carbon Trust report 2010)*

- Choose approach based on characteristics of sectors
- for Steel:
 - * Transitional Free allowances
 - * Monitor potential leakage
 - * Work with other countries:
 - on mutual recognition of carbon leakage sectors and
 - on options for border levelling for specific steel products
 - * Objective to reflect full costs by 2020 by one of
 - import levelling
 - export adjustment by producer countries, or
 - carbon-cost reflecting global sectoral agreement



STRATEGIC ISSUES

- Investment Costs: financeability and profitability
- Operating Costs: need for climate-related trade policy?
- Implications for Location:
 - Within EU: Clusters? North Sea?
 - Outside EU: Challenge of lower cost locations for lower cost blast-furnace-based steels?
- Challenge from DRI-based processes? (potential implications of lower-cost gas?)

